



# Briefing Note

Commission for Labor Cooperation

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## TRENDS IN LABOR PRODUCTIVITY IN MANUFACTURING IN NORTH AMERICA

An analysis of trends in labor productivity in manufacturing reveals differing levels and patterns of change across the three NAFTA countries during the 1990s and early 2000s. While labor productivity has grown steadily in the United States, in Mexico it grew at extraordinarily high rates in the years after NAFTA came into effect, followed more recently by a decline in the rate of growth. Conversely, labor productivity in Canadian manufacturing has been in continuous flux. This briefing note will highlight the patterns in, and some of the factors affecting, trends in labor productivity in North American manufacturing since the early 1990s.

### Labor Productivity

Labor productivity is defined as output per unit of labor input (see textbox for more details). It essentially measures the extent to which firms and industries “take advantage of better education, training, management, equipment, and technology to increase the amount of production per worker” (<http://www.bankofcanada.ca>). Labor productivity is commonly used as an indicator of a country’s living standards, and is associated with comparative economic growth and prosperity.

When comparing labor productivity across countries, it is imperative to distinguish between *levels* of productivity and rates of productivity *growth*. Comparing levels of labor productivity is difficult because output must be converted into a common currency, and because there are differences in the way countries define and compile data on both out-

put and labor input. Thus, growth is the standard for international comparisons (Schreyer 2001).

### Individual Country Trends

Changes in Canadian labor productivity in manufacturing over the past decade have been characterized by large swings in relatively short periods of time (see figure 1). For the three years prior to NAFTA (1991–1993), labor productivity in Canada grew continually, reaching a decade high (6.0%) in 1993. Subsequently, the annual growth rate of productivity declined, and was actually negative in 1996 (-2.4%). Productivity change then stabilized until 2000, when a two-year period of decline in growth ensued, coinciding with the technology bubble burst and subsequent recession. Solid growth (2.8%) returned in 2002.

For most of the past decade, U.S. manufacturing has registered continual productivity gains, highlighted by a steady upward trend from 1993 to 1999. The recession of 2001 had a negative impact on manufacturing labor productivity, contributing to its lowest growth (1.6%) of any year in our reference period; however, high growth quickly returned in 2002 (6.1%).

Year-on-year increases in labor productivity in Mexican manufacturing have been substantial since 1994; in fact, in two years (1994 and 1996), productivity growth reached or surpassed 9%. Furthermore, there have only been two years in the past decade (1999 and 2001) in which labor productivity did not rise by at least 4%. Nonetheless, while Mexico has led North America during our reference period, the annual rate of labor productivity growth has been declining in Mexican manufacturing since 1996, and performance for the past three years has been equivalent to that of the United States.

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### Comparative Trends

Labor productivity growth in Canadian manufacturing has lagged behind the rest of North America. From 1993 to 2002, productivity growth averaged 2.0%, compared with 3.8% for the United States and a nine-year average (1994–2002) of 4.9% for Mexico (see figure 1). In addition, Canada is the only country in the region to have experienced declines in labor productivity (in 1996 and 2001). Nonetheless, manufacturing output in Canada expanded rapidly during the late 1990s (OECD 2001). This was due in part to its advantageous labor cost position relative to the United States, a result of the low value of the Canadian dollar vis-à-vis its U.S. counterpart. More recently, Canadian manufacturing output has decreased as demand in the U.S. automotive and information and communication technologies sectors has waned (more than 80% of all Canadian exports are sold in the United States).

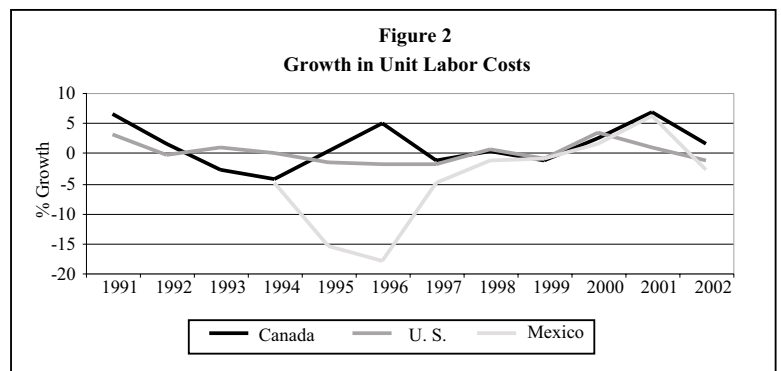
Labor productivity in U.S. manufacturing during the 1990s and early 2000s has grown faster than in any other G-7 country (Cobet and Wilson 2002). In fact, while productivity has continuously increased in virtually all highly industrialized nations over the past fifty years, the United States, and North America in general, has experienced a unique acceleration during the past decade in comparison to other economic regions.

There is a strong linkage between these productivity trends and variations in unit labor costs (i.e., the cost of compensating labor for

each unit of output). Changes in unit labor costs reflect the net effect of changes in the compensation paid to workers and changes in labor productivity. Thus, unit labor costs will rise when hourly compensation rises at a faster pace than productivity. Conversely, should labor productivity increase more quickly than hourly compensation, then unit labor costs will decline (Cobet and Wilson 2002).

Annual changes in unit labor costs in the three countries are shown in figure 2. The ten-year average for unit labor cost growth in the U.S. (-0.4%) was lower than in Canada (0.6%), yet substantially higher than the nine-year growth average in Mexico (-4.7%).

While Mexican unit labor costs have grown at a rapid pace since 1996, labor productivity has grown even faster; in fact, Mexican labor is less expensive today than it was during the mid-1990s (Quintin 2003). Nonetheless, comparative costs are what affect competitiveness. Unit labor costs in Mexican manufacturing have risen above those in many Asian countries, vigorous competitors with Mexico for lucrative American markets (Esterl 2002). This has led some economists to question the competitiveness of Mexico's low-skilled manufacturing sector in comparison to its Asian competitors, particularly China (Smith 2003; Watkins 2002). These problems could be further exacerbated should the peso resume appreciation against the U.S. dollar, while China's currency remains tied to the U.S. dollar. Similarly, Canada's competitiveness, particularly with the U.S., in highly skilled manufacturing is also at risk as its dollar appreciates. The profit mar-



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gins of Canadian firms will inevitably decrease due to the rising value of the Canadian dollar and a potential loss of exports to the United States, as U.S. firms improve their competitiveness and/or the country's markets shrink.

## Conclusion

In comparison with other regions of the world, North America's manufacturing labor productivity has performed quite well over the past decade. Nonetheless, new challenges, such as intensified globalization, a falling U.S. dollar, and an anemic world economy, have put this positive performance in jeopardy.

The recent economic downturn has led to a decline in manufacturing employment in all three countries. Such a scenario, while not beneficial to

the individual labor markets, might actually lead to higher productivity growth and decreased unit labor costs across the region. A devalued U.S. dollar might induce both Canadian and Mexican firms to increase investment in emerging technologies and to restructure their work practices, thereby boosting labor productivity in order to retain their market share. Such action makes firms more profitable and, eventually, increases demand for labor inputs (i.e., raising employment levels). Similarly, the United States might break into new markets, namely Europe, thus increasing demand for labor, effectively stimulating employment levels in manufacturing.

In the end, the manufacturing industry will inevitably change—as it has always done. Just as economies undergo cycles, industries do the same.

## Definitions and Data Sources

**Definitions:** *Labor productivity* refers to output per hour worked in all three countries.

*Output* is calculated using the gross-output method in Mexico, the value-added approach in Canada, and the sectoral output concept in the United States. (see Schreyer [2001] for a detailed explanation of the differences between the gross output and value-added methods; see <http://www.bls.gov/news.release/prod2.tn.htm> for an explanation of the sectoral output concept).

*Labor input* (i.e., hours worked) is derived from industry-level survey data (revealing *hours actually worked*) in Canada and the United States. In Mexico, hours worked are estimated using a component model (producing *hours paid* data), in which estimates are based upon an econometric model that combines estimates of paid or "usual" hours, estimates of "unusual" working hours (e.g., overtime), and also controls for various types of hours not worked (e.g., vacations) (see Van Ark and McGuckin [1999] for an explanation of component models).

*Unit labor cost* is the compensation paid to labor per unit of output. Compensation includes wages and salaries and other costs paid by the employer (e.g., pension contributions, social security taxes, etc.)

**Sources:** For Canada, data on productivity and labor costs is from Statistics Canada, which operates Canada's productivity program as part of the Canadian System of National Accounts. This data can be obtained via the CANSIM database (Harchaoui et al. 2001). Canadian figures after 1997 reflect the North American Industrial Classification System (NAICS). The full historical time series is presently being completed by Statistics Canada. (The United States and Mexico are currently converting their time series manufacturing productivity data to the NAICS system, thus the data presented for these two countries does not reflect the NAICS).

For the United States, productivity and labor cost data are from the Bureau of Labor Statistics' Major Sector Productivity and Costs program. They can be obtained online, at <http://www.bls.gov/lpc/home.htm>.

Mexican productivity and labor cost data is from the Encuesta Industrial Mensual. It can be found online at <http://www.inegi.gob.mx>. Statistics for Mexico prior to 1994 are not fully comparable with subsequent data and are therefore not presented in this analysis. In addition, the Encuesta Industrial Mensual covers manufacturing industries representing approximately 80% of the value of gross manufacturing output (the Canadian and U.S. surveys cover all manufacturing industries)

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